

10/583793

iAP20 Rec'd PCT/PTO 21 JUN 2006

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TRANSLATIONS FROM AND INTO ALL LANGUAGES PREPARED BY SPECIALISTS

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VERIFICATION OF TRANSLATION

Title of Translated Document:

**Replacement pages 2 and 2a for PCT Application PCT/EP2004/014022, and
Written Opinion of the International Examining Authority**

Original Language of Translated Document: **German**

The undersigned declares that:

1. I am a professional translator with English as a native language and German as an acquired language. With over thirty years of full-time translating experience in general, medical, technical, chemical and related fields.
2. To the best of my knowledge and belief, the attached is a true, accurate and complete English translation of the above-referenced German document

Date: May 31, 2006

Signature: A.M. Russell
A.M. Russell

In addition, the rpm ranges are different in the turbocoupling mode and in the retarder mode. Overall, there usually results an rpm range between 4000 rpm and 12,000 rpm. The inlet and outlet seals, i.e., the seals with which the channels introducing the working medium and the channels discharging the working medium are sealed, are operated in this rpm range. In all relative seals, i.e., in seals between the components, when one of these rotates at a different rpm than the other and when one rotates and the other does not rotate, there is the problem, in particular, that two distinct operating ranges are present. Therefore, relative seals are conventionally designed in the form of an expensive floating ring seal. Such a floating ring seal is comparatively expensive and sensitive to disruption.

GB-A-1,424,704 discloses a hydrodynamic coupling with a stationary hub, which is surrounded by the pump wheel. Axial channels are provided in the stationary hub, and the working medium is introduced and evacuated through these channels.

GB-A-1,194,739 discloses a locomotive with a fluid drive. A supply channel for fluid and an evacuation channel for fluid are provided in the drive shaft of the fluid drive, which bears wheels.

Reference is also made to the following documents with respect to hydrodynamic couplings:

GB-A-892,314

US-A-4,773,513

US-A-5,138,840

The object of the invention is to provide a hydrodynamic coupling, particularly for application in a turbocompound system, which is improved when compared with the prior art. In particular, the hydrodynamic coupling according to the invention will make do with fewer floating ring seals.

The object according to the invention is solved by a hydrodynamic coupling with the features of claim 1. Claim 8 describes a corresponding drive train according to the

invention. The subclaims describe particularly advantageous enhancements of the invention.

The hydrodynamic coupling according to the invention is characterized by the fact that in a drive shaft, which drives the primary impeller, a supply channel is formed for introducing the working medium into the working chamber and an evacuation channel is formed for the simultaneous evacuation of working medium from the working chamber. Of course, several supply channels and several evacuation channels may also be provided. In particular, a central supply channel and several evacuation channels surrounding this central supply channel are considered.

PATENT COOPERATION TREATY

From the
INTERNATIONAL EXAMINING AUTHORITY

PCT

To: See Form PCT/ISA/220

Stamp: Received
Dr. Weitzel & Partners
March 14, 2005

**WRITTEN OPINION OF
THE INTERNATIONAL
SEARCHING AUTHORITY**

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Final deadline: 10/22/05 (PCT Rule 43bis.1 PCT)

Date of mailing

(day/month/year) See Form PCT/ISA/210 (Sheet 2)

Applicant's or representative's file reference See Form PCT/ISA/220	FOR FURTHER ACTION See 2 below	
International Application No. PCT/EP2004/014022	International filing date (day/month/year) 9 December 2004	Priority date (day/month/year) 22 December 2003
International Patent Classification (IPC) or national classification and IPC F16D33/06		
Applicant VOITH TURBO GMBH & CO. KG et al.		

1. This report contains indications relating to the following items:

- ☒ Box No. I Basis of the Office Action
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step, and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Statement with grounds according to Rule 43bis.1(a)(I) with regard to novelty, inventive step, and industrial applicability; documents and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the International Patent Examination Authority [symbol] European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Netherlands Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized officer J. Giraldez Sánchez [symbol] European Patent Office Tel. +31 70 340-3488
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Form (PCT/ISA/237 (Cover sheet) (January 2004)

10/583793

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY**

International Application No.

PCT/EP2004/014022

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Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on the translation from the original language into the following language, which is the language of the translation furnished for the purposes of:
international search (under Rules 12.3 and 23.1 (b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material
☐ on paper
☐ in electronic form
 - c. time of filing/furnishing
☐ contained in the international application as filed
☐ filed together with the international application in electronic form
☐ furnished subsequently to this Authority for the purposes of search
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY**

International Application No.

PCT/EP2004/014022

Box No. V Statement with grounds according to Rule 43bis.1 (a)(1) with regard to novelty, inventive step, and industrial applicability; documents and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims 2-10
	No:	Claim 1
Inventive step (IS)	Yes:	Claims
	No:	Claims 1-10
Industrial applicability (IA)	Yes:	Claims: 1-10
	No:	Claims:

2. Documents and explanations:

See Annex

Regarding Item V

Statement with grounds with regard to novelty, inventive step, and industrial applicability; documents and explanations supporting such statement

1. Reference is made to the following documents:

D1: GB-A-1,424,704 (FRANCAISE DU FERODO SA), February 11, 1976 (2/11/1976)

D2: GB 194,739 A (HEINRICH SCHNEIDER) March 19, 1923 (3/19/1923)

D3: GB 892,314 A (HEENAN & FROUDE LIMITED) March 28, 1962 (3/28/1962)

D4: US-A-4,773,513 (HERRMANN ET AL.) September 27, 1988 (9/27/1988)

D5: US-A-5,138,840 (OGUCHI ET AL.) August 18, 1992 (8/19/1992)

2. The present application does not fulfill the requirements of Article 33(1) PCT, since the subject of claim 1 is not novel in the sense of Article 33(2) PCT.

Document D1 discloses (the citations in parentheses refer to this document):

Hydrodynamic coupling with a primary impeller;

--with a secondary impeller;

--the primary impeller and the secondary impeller together form a toroidal working chamber;

--the primary impeller is disposed on a drive shaft or is an integral part of this shaft; whereby,

--in the drive shaft are formed at least one supply channel (52) for introducing working medium into the working chamber and at least one evacuation channel (51) for the simultaneous evacuation of working medium from the working chamber.

2.1. Document D2 also shows all features of claim 1 (see Figure 2).

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (ANNEX)**

International Application No.

PCT/EP2004/014022

3. The dependent claims 2-10 do not contain features, which fulfill, in combination with the features of any other claim to which they refer, the requirements of the PCT relative to novelty or inventive activity; see documents D1-D5 and the corresponding text citations indicated in the Search Report.